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Subjective Experiences of Life Events Match Individual Differences in Personality Development

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The last 2 decades have witnessed increased research on the role of life events in personality trait development, but few findings appear to be robust. We propose that a key to resolving this issue is incorporating individuals' subjective experiences into the study of event-related development. To test this, we developed and administered a survey about event-related personality change to a representative Dutch sample ($N = 5,513$, Ages 16–95) and linked their responses to 12-year trajectories of measured Big Five development. Most participants (63%) believed that a life event impacted their personality in the past 10 years, on average 5 years presurvey. These participants, even those who experienced the same event, had markedly heterogeneous perceptions of how their traits changed and why each event affected their personality. In preregistered analyses, we examined participants' individual personality trajectories before and after the event that they identified as most impactful. Across events, retrospective perceptions of event-related personality change were significantly correlated with short-term and long-term postevent personality trajectories across Big Five traits (mean $r_s = .22, .28$) and preevent trajectories in all traits except agreeableness (mean $r = .16$). We also found correspondence between perceived and measured development in analyses of the two most commonly reported personality-changing events: health problems and death of a loved one/family member. Finally, we explored associations between personality development and perceived change-inducing event characteristics. Using these findings, we argue that future research into event-related personality development should de-emphasize mean-level change to focus on individuals' varied experiences of whether, when, how, and why life events have affected their personality.

Keywords: personality development, Big Five, life events, personality change

Supplemental materials: <https://doi.org/10.1037/pspp0000483.supp>

Personality trait development occurs across the entire lifespan (Bleidorn et al., 2022; Roberts et al., 2006). A large and growing body of research has tested the role that life events, like parenthood, retirement, and graduation, play in personality trait development (Bleidorn et al., 2018). The most common approach in this research has been to compare differences in personality development between those who did and did not experience the event (e.g., Hudson & Roberts, 2016; Specht et al., 2011) or to chart mean-level developmental trajectories before, during, and after people experience the event (e.g., Buecker et al., 2021; Denissen et al., 2019; Lüdtke et al., 2011). These approaches reflect the implicit assumption that a given life event tends to affect different people in

similar ways, leading to an observable mean-level change in all people who have experienced that event. However, research using these approaches has led to mixed and often conflicting evidence about how and even if major life events are associated with personality trait change (e.g., Beck, 2019; van Scheppingen et al., 2016). Recently, researchers have hypothesized that life events have much more heterogeneous effects on personality development than previously thought (Bleidorn et al., 2020; Jayawickreme et al., 2021; Luhmann et al., 2021). People may approach, experience, and adapt to the same event in very different ways, leading them to change differently (Lodi-Smith & Roberts, 2007). Measuring people's retrospective perceptions of life events, including whether they

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Researchers can apply for access to study data at <https://www.lissdata.nl/access-data>. Materials and code are available at https://osf.io/3dz87/?view_only=6d33cbe81a91401683aa74e620fabfb2.

Ted Schwaba played a lead role in conceptualization, formal analysis, methodology, visualization, and writing—original draft. Jaap J. A. Denissen played a lead role in writing—review and editing and a supporting role in

conceptualization and methodology. Maike Luhmann played a lead role in writing—review and editing and a supporting role in conceptualization and methodology. Christopher J. Hopwood played a lead role in writing—review and editing, a supporting role in methodology, and an equal role in conceptualization. Wiebke Bleidorn played a lead role in supervision and writing—review and editing, a supporting role in methodology, and an equal role in conceptualization.

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believe an event was impactful, which traits they believe were affected by the event, and important event characteristics that they believed caused them to change can provide insight into this heterogeneity, improving our understanding of the complex links between life events and personality trait development.

In this article, we provided a systematic and preregistered investigation into individual perceptions of event-related personality change and their associations with measured personality trait development in the years surrounding a life event. First, we surveyed a large, representative sample of Dutch adults ($N = 5,513$ participants Ages 16–95) about their perceptions of whether, which, how, and why a life event in the past 10 years affected their personality traits. Responses provide novel insights into the ways in which people perceive event-related personality change both within and across events. Then, we linked these retrospective perceptions of event-related change to measured personality development. Specifically, participants had independently completed self-report measures of the Big Five personality traits (extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience; John et al., 2008) in most years from 2008 to 2020, which we used to estimate trajectories of personality development surrounding the event. By linking perceived to measured change, we were able to test three sets of preregistered hypotheses about whether retrospective perceptions of life events were associated with heterogenous patterns in personality trait development before and after a major life event. Overall, these analyses have the potential to reveal how measuring people's varied and unique event experiences can improve our understanding of event-related personality development.

Quantifying Retrospective Perceptions of Event-Related Personality Change

While major theories consider life events to be driving forces of personality development (Specht et al., 2014; Wrzus & Roberts, 2017), and narrative research often focuses on the role of life events in personal stories (Pasupathi et al., 2007; Singer et al., 2013), little research has systematically investigated whether and how people perceive life events impact their personality development.

Perhaps the most basic question is whether people generally believe that their personality was changed by a life event. People generally perceive that their current personality differs from their past personality (Quoidbach et al., 2013), but the perceived sources of this change have yet to be quantified. In student and community samples, one study found that most participants believed that a hypothetical set of life events would impact their personality traits (Rakhshani et al., 2022) but no population-representative evidence has been collected to date about the proportion of people who attribute their own personality change to life events.

The second question is which events people believe are likely to cause change in their personality. Addressing this question can highlight specific events that are particularly salient across people. For example, it may be that negative events, like losing a family member, are perceived as more impactful than positive or neutral events, as they are more memorable or threatening to survival (Baumeister et al., 2001). This question also can inform theories about what events matter most to specific subgroups. For example, gerontological perspectives argue that, as people grow older, they become more attuned to the effects of events indicative of loss and aging, as opposed to the gain-based events indicative of growth and

expansion that younger adults tend to focus on (Baltes, 1997; Diehl & Wahl, 2010). From a practical perspective, identifying the events perceived as particularly impactful can help researchers calibrate future research questions to study people's lay theories about what does (or does not) impact personality development.

There is also value in measuring which personality traits people believe are affected by life events, and how they are perceived to change. Recent theoretical frameworks emphasize that the effects of events may be especially heterogenous across people (Bleidorn et al., 2020; Jayawickreme et al., 2021; Luhmann et al., 2021), and research has supported this claim by finding marked variation in perceived event characteristics among people who experience the same life event (Haehner et al., 2022; Kritzler et al., 2022). To extend this argument, it is valuable to investigate whether people who experienced the same event also display marked variation in perceived personality trait change. In other words, just as research has demonstrated that an event like graduating from college varies in valence and extraordinariness across people, so too might people differ in their perceived extraversion change following graduation.

As a corollary, investigating correlations between perceived change in different traits informs our understanding of which traits may change together, and which change separately from one another. Perceived change in one trait may be correlated with perceived change in others, which would indicate that people generally perceive life events as broadly acting levers of personality change. Alternatively, perceived change in one trait may be relatively uncorrelated with others, indicating that people perceive that events affect them in specific ways. Studying this structure bolsters our general understanding of how people understand their own maturation (Klimstra et al., 2013; Schwaba et al., 2022).

Finally, asking people about which characteristics of the life event caused their personality to change can provide useful information into the ingredients underlying perceptions of change. For example, (perceived) change in a certain trait, like agreeableness, might be linked to event-related characteristics, like changes in one's reputation. This would indicate that there may be common underlying characteristics driving perceived change across events. Alternatively, just as different people perceive the same event to have different characteristics (Haehner et al., 2022; Kritzler et al., 2022), different people may attribute change in the same trait to different characteristics of the event, which would indicate that perceived characteristics underlying change are also highly person specific.

Connecting Retrospective Perceptions of Event-Related Personality Change to Measured Personality Trajectories

In addition to helping us understand how people make sense of their own personality development, studying perceptions of event-related personality change can also provide a valuable window into understanding individual differences in personality development over time. Though some scientific and lay perspectives converge on the idea that life events affect personality (for an exception, see McCrae et al., 2000), there is little evidence for replicable links between life events and personality trait development. For example, across four studies on retirement, retirees have been found to decline in conscientiousness (Asselmann & Specht, 2021), increase in agreeableness (Löckenhoff et al., 2009), increase in openness and

agreeableness (Schwaba & Bleidorn, 2019), or increase in extraversion, conscientiousness, and emotional stability but decrease in openness (Hill et al., 2022). Studies that have compared individuals who experienced an event to a matched control group have found small differences, if any, between those who did and did not experience an event (Beck, 2019; van Scheppingen et al., 2016; but see Golle et al., 2019; Jackson et al., 2012). Furthermore, investigations with more frequent trait measurements before, during, and after a life event have revealed nonlinear patterns of development, often beginning before the event, complicating our understanding the ways in which life events affect personality change (Denissen et al., 2019; Hopwood et al., 2022; Luhmann et al., 2021; van Scheppingen & Leopold, 2020). Surveying this body of evidence, it is difficult to derive conclusions about the direction, strength, or duration of the effects that life events have on personality trait development (Bleidorn et al., 2018; Jackson & Beck, 2021; Luhmann et al., 2021).

Attending more closely to individual differences may be the key to resolving this discrepancy between theory and research on the effects of life events on personality traits. Virtually all research on personality development has found that people change differently from one another, both in the context of life events (Jackson & Beck, 2021; Specht et al., 2011), and with age (Roberts & Mroczek, 2008; Schwaba & Bleidorn, 2018). These individual differences in change surrounding events may dilute mean-level effects, providing an explanation for why effects of life events on average trait change do not always replicate and indicating that individual-level changes in personality traits should be the focus of event-related change research.

Past research, recognizing the importance of individual differences in event-related development, has focused primarily on person-related moderator characteristics, like demographics or preexisting personality trait levels (e.g., Bleidorn et al., 2021; Duckitt & Broil, 1982; Gunty et al., 2011; Hughes et al., 2021). These studies have found inconsistent results, perhaps because such characteristics do not capture the wide variety of experiences that an event may entail with sufficient specificity (Luhmann et al., 2021). Instead, directly measuring people's experiences of life events may be key to unraveling heterogeneity in event-related developmental trajectories (e.g., Borghuis et al., 2020; Hutteman et al., 2015; Wrzus et al., 2021).

Thus, we examined whether perceptions of event-related personality change were associated with individual differences in measured personality trajectories (Bleidorn et al., 2020; Haehner et al., 2022; Sutin et al., 2010). We tested three sets of hypotheses about the links between subjective perceptions of event-related change and measured personality development.

Consistency Between Retrospective Perceptions of Change and Measured Change

For our first set of hypotheses, we examined whether perceptions of event-related change were consistent with measured change in the years surrounding the event. Significant associations between the two would indicate that individuals recalled how their personality traits changed following an impactful life event in a way that is consistent with their measured change. It would also challenge the perspective that life events are not systematically associated with change in personality traits (Bleidorn et al., 2018; Infurna & Jayawickreme, 2019; Jackson & Beck, 2021). Rather, finding that people's developmental trajectories match their perceptions of how the event

affected them would suggest some level of self-insight into the effects of life events on measured trends in personality development. This would encourage researchers to pay greater attention to each person's experiences as they navigate life events in order to better disentangle developmental heterogeneity and identify a clearer signal of life events on personality traits (e.g., de Vries et al., 2021; Haehner et al., 2022).

Though no research to date has tested the correspondence between perceptions of event-related change and measured personality change surrounding that event, some studies have examined links between perceived and measured personality development outside the context of life events, finding that the two generally correlate around $r = .20$ (Bossert et al., 2022; Oltmanns et al., 2020; Robins et al., 2005). These studies found that people appear to have at least some insight into their past personality development. Also, narrative research suggests that people are attentive to the role that events play in their own life stories (Pasupathi et al., 2007; Singer et al., 2013). Thus, participants may be able to accurately identify specific events that affected them and evaluate the extent to which those events precipitated change in their personality traits. We also designed the present study to maximize correspondence between perceived and measured change: participants themselves indicated if, when, and which event most affected their personality, allowing them to report on a particularly salient, major occurrence. Thus, the correspondence might be quite high.

On the other hand, biases in recollection and the multidetermined nature of personality traits may reduce correspondence between perceived and measured event-related change. Participants may generally recall events that are vivid, even if those events were inert (Kahneman et al., 1982) and may ignore subtle events, even if those events were impactful. They may also be biased by their present circumstances when retrospectively on their past, reducing correspondence (but see Goltermann et al., 2023). Correspondence between perceived and measured change may also be reduced if participants are primarily attentive to how events have affected their identity and use that to erroneously infer change in personality traits. For example, a college student may enter the workforce and point to graduation as a life-changing event because it affected their sense of self and daily routine, even though that event may have had little effect on their personality trait development. Adding further complication, a person's perceptions of change may be consistent with their measured development but not accurately attributed. For example, someone may misattribute biologically driven or stochastic change to a life event that occurred around the same time (for this reason, we interpret results in terms of consistency and correspondence rather than accuracy). Perhaps most importantly, personality is shaped by a multitude of forces, including sequences of life events, day-to-day experiences, and genetic factors (Bleidorn et al., 2020), so perceived effects of a single life event may be overwhelmed by the cumulative effects of other forces. With these considerations in mind, it is an open question whether perceived and measured personality trait change will be consistent with one another.

Perceived and Measured Change Following Specific Life Events

In our second set of hypotheses, we focused on the correspondence between perceived change and measured development among participants who reported on two specific life events: loss of a loved one/family member and health problems, which were the most

commonly mentioned personality-changing events among our sample ($Ns > 500$). These analyses add specificity, testing whether links between perceived event-related change and measured development hold in two specific event cases.

Focusing on particular events rather than aggregating across all experiences allowed us to compare mean-level trajectories to individual differences in development. How does the average person who reported personality change from these events develop over time, and to what extent does incorporating perceptions of change improve our understanding of development? Past research has found no clear pattern of associations between health problems (such as chronic disease and declines in physical functioning) and subsequent personality trait development, both within and across studies (Jokela et al., 2014; Mueller et al., 2016; Sutin et al., 2013). Research on bereavement and personality development has provided similarly mixed results (Chopik, 2018; Hoerger et al., 2014; Specht et al., 2011). Thus, health problems and loss of a loved one/family member served as prime test cases for the proposition that event-related personality development may be better understood in terms of heterogeneous individual-level development than a single mean-level developmental trajectory.

Measured Change and Perceived Change-Inducing Event Characteristics

For our third set of hypothesis tests, we examined how perceived change-inducing characteristics of the event were associated with measured personality trait development before and after the event. Several studies have investigated how individual differences in event experience are linked to individual differences in personality development (De Vries et al., 2021; Haehner et al., 2022; Kandler et al., 2012; Sutin et al., 2010). These studies, which have typically followed participants over the course of a year, have identified links between the valence of events and personality trait development, finding that people who experience an event positively, or as a lesson learned, tended to become more emotionally stable, agreeable, and extraverted, whereas people who experience an event negatively tended to decrease in emotional stability. We sought to replicate these findings across a longer period of time and include additional event-related characteristics beyond valence that might be associated with development.

We also explored the associations between perceptions of event characteristics and personality trait levels in the year of the event. A recent study found small correlations between personality traits and perceptions of life event characteristics; the two were mostly independent (Rakhshani et al., 2022). This suggests that event perceptions are not entirely shaped by preexisting personality traits; even highly emotionally stable, extraverted people perceive some events as negative and stressful. We sought to replicate this finding when asking participants specifically about whether these event characteristics caused personality change.

The Present Study

In the present study, we quantified perceptions of event-related personality change and then connected these perceptions to past measured change, using data from a large representative panel study in the Netherlands (Scherpenzeel, 2011). First, we developed and administered a questionnaire to participants to assess whether their

personality was affected by a life event in the past 10 years, which event affected them most, how their personality traits were affected by the event, and why different characteristics of the event may have led to these personality changes. We first describe participants' responses to these questions, providing detailed insight into how laypeople believe life events may affect personality traits.

In a preregistered follow-up, we then examined associations between these perceptions and up to 10 years of measured personality change in the same participants. We tested three sets of hypotheses. First (Hypothesis 1), collapsed across events, we tested whether perceived changes in each of the Big Five traits were associated with measured development in the years following the event (Hypothesis 1a), in the years leading up to the event (Hypothesis 1b), and with trait levels in the year of the event (Hypothesis 1c). We hypothesized that, for each of the Big Five traits, perceptions would be significantly associated with individual differences in measured personality trait development following the event. Second (Hypothesis 2), we tested the correspondence between perceived and measured postevent change for the two most common personality-changing events: health problems (Hypothesis 2a) and loss of a loved one/family member (Hypothesis 2b). We hypothesized that significant associations between perceived and measured change would extend to these two specific events. Third, we examined the extent to which nine perceived change-inducing event characteristics were associated with measured Big Five trait development in the years after the event (Hypothesis 3a) and before the event (Hypothesis 3b), as well as with trait levels in the year of the event (Hypothesis 3c).

Method

Transparency and Openness

This study was preregistered in two parts. Part 1, where we surveyed retrospective perceptions of event-related change, was preregistered at <https://osf.io/x9nbv/>. Part 2, where we connected these perceptions to past measured change, was preregistered at <https://osf.io/kmgwd/>, following the completion of Part 1. This allowed us to make analytic decisions that were informed by the results of Study 1 (e.g., identifying two events, death of a loved one/family member and health problems, for further analysis). To ensure that results from Study 1 did not bias our hypotheses, we did not estimate any associations between the Life Event Study questionnaire, which measured perceived change, and the Personality questionnaire, which measured yearly Big Five traits, until completing the second preregistration. We document our prior knowledge of personality development in the LISS data set in the online [Supplemental Materials](#). In the following sections, we report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures used in the study. We also report how researchers can access the data used in the study and provide links to materials and code.

Sample

Data for this study came from the Longitudinal Internet Studies for the Social Sciences (LISS) panel (Scherpenzeel, 2011), which followed a representative sample of the Dutch population from 2008 to 2022 (<https://www.dataarchive.liissdata.nl/>). The panel is based on a true probability sample of households drawn from the

population register of the Netherlands. All LISS data are freely available to academic researchers who apply for access. Our sample for this study consisted of all LISS participants who completed the Life Event Study questionnaire, a survey that we designed and administered to measure perceptions of event-related personality change (https://www.dataarchive.lissdata.nl/study_units/view/1163; total $N = 5,513$). The LISS panel survey frequently adds additional participants in order to balance dropout; Life Event Study participants came from all LISS cohorts (2008, 2010, 2012, 2014, and 2018). Participants who completed the questionnaire were, on average, 53 years old ($SD = 18.50$, range = 16–103), the median education level resembling the equivalent of a U.S. high school education, and 53% were female (see Eckman, 2016, for more demographic information).

Measures

Life Events Study Questionnaire

In December 2020, LISS participants were administered the Life Events Study questionnaire. This questionnaire and data are available at the above link in both English and Dutch versions; LISS participants were administered the Dutch version.

Experiencing a Personality-Changing Event. Participants were first asked, “Think about the past 10 years. Have you experienced a life event that changed who you are as a person? This can be any event, small or big. Yes/no.” Participants who responded “no” were then informed that they were not eligible to participate in the study (they did not know this would be the case when responding to the question). Participants who responded “yes” proceeded to fill out the remainder of the questionnaire. They were next asked “What was that event? (If you experienced more than one event, please describe the event that impacted you most) [free response].” Then, participants were asked “Does this event fit into one of the following categories? (check one or more). This is the same event as the one you described before.” Participants selected from 16 different event categories such as retirement, travel, and trauma. We reviewed responses from participants who selected the 16th category, “No, the event does not fit any of the categories.” We recoded 112 of the 397 responses in this category into one of the other categories (e.g., the response “my brother died” was recoded as “death of a loved one or family member”) and extracted from these, as preregistered, an additional category with over 50 respondents: general relationship problems ($N = 57$). Adding this category resulted in a final tally of 17 categories: 16 substantive event categories and one catch-all other category.

Participants were next asked “In which year did the event happen? (2020–2011).” We used responses to structure the temporality of developmental analyses.

Perceptions of Personality Change. Participants were then asked about the extent to which their personality traits changed from this event (“A life event can increase or decrease certain traits, or they can remain unchanged. Please indicate whether and to what degree the event changed you regarding the following traits: $-3 = I$ have become much less to $0 = I$ have not changed to $3 = I$ have become much more”). Participants were asked about 10 trait pairs that measured the high and low poles of each Big Five factor (e.g., agreeableness was measured with two items, the positive trait pairs “empathic, friendly,” and the negative trait pairs “cold, rude”). We

designed these pairs to correspond as closely to the Big Five content measured in the 50-item International Personality Item Pool survey assessed among LISS participants (for further details on this process, see the [online Supplemental Materials](#)). We decided to measure pairs of descriptors in each item to maximize the breadth of measured content (e.g., Gosling et al., 2003), and we limited the survey to two items per Big Five trait to minimize participant burden while still assessing positively and negatively keyed content that negate acquiescence bias (Soto & John, 2017). The correlations between the two trait pairs were $r = -.18$ for extraversion, $r = -.36$ for agreeableness, $r = -.27$ for conscientiousness, $r = -.41$ for emotional stability, and $r = -.20$ for openness. Scree plots indicated that, as intended, a five-factor solution fit the covariance among these 10 items well (see [online Supplemental Materials](#)).

Perceived Change-Inducing Event Characteristics. The Event Characteristics Questionnaire was developed to measure a dimensional taxonomy of perceived life event characteristics, including the emotional significance, predictability, and challenge associated with events (Luhmann et al., 2021). In this study, we adapted the Event Characteristics Questionnaire to specifically assess the impact of those event characteristics on personality development. Specifically, participants were asked about characteristics of the event that they perceived affected their personality (“This event had an impact on my personality because ...” $1 = \textit{does not apply at all}$ to $5 = \textit{applies completely}$). We combined the items “the event was positive” and “the event was negative” because they were highly correlated ($r = -.69$), resulting in nine event characteristics.

Big Five Personality Traits

Every 1–3 years from 2008–2015 to 2017–2020, LISS participants were administered the 50-item International Personality Item Pool Big Five questionnaire (Goldberg, 1992), which measures extraversion, agreeableness, conscientiousness, emotional stability, and openness using 10 items each. We estimated the internal consistency of each Big Five trait in the year that participants reported the personality-changing event occurred. Both Cronbach’s α and unidimensional omega (Flora, 2020) indicated acceptable internal consistency: extraversion $\omega_u = .89$ and $\alpha = .89$, agreeableness $\omega_u = .83$ and $\alpha = .82$, conscientiousness $\omega_u = .78$ and $\alpha = .77$, emotional stability $\omega_u = .89$, $\alpha = .89$, and openness $\omega_u = .76$ and $\alpha = .77$.

General Analysis Plan

Analyses for this study were conducted in R Version 1.3.1093 (R Core Team, 2020). We visualized results using the R package ggplot2 3.3.3 (Wickham, 2011) and conducted additional analyses using psych 2.0.12 (Revelle, 2017). Analysis scripts are available at <https://osf.io/3dz87/>. In Part 1 of results, we present descriptive results of the Life Events Questionnaire, and in Part 2, we present results of our hypothesis tests linking perceived and measured personality development. Throughout the article, we used $p < .01$ as our preregistered significance threshold and interpreted effect sizes according to Funder and Ozer (2019).

Results

Part 1: Perceptions of Event-Related Personality Change

Do People Believe That Life Events Have Changed Their Personalities?

In total, 63% of participants in this representative sample ($N = 3,474$) indicated that a life event had changed their personality traits in the last 10 years. Temporally, these events were distributed relatively evenly between 2012 and 2015 (Figure 1), though an outsized number of participants indicated that the event occurred in 2011, perhaps indicating that some participants reported on events that occurred earlier than 10 years ago yet selected the earliest possible date to accommodate their response.

Which Events Are Thought to Have Changed Personality?

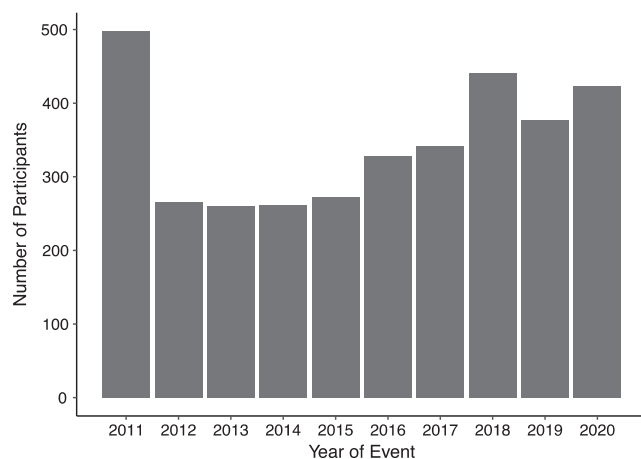
We next examined the particular events that participants indicated had the greatest impact on their personality in the past 10 years. Participants named a wide variety of events, ranging from those that are common (graduating school, diagnosis with illness) to rarer, idiosyncratic events (adopting a horse, manslaughter, teaching refugee children). In Figure 2, we present a word cloud of the most commonly used words in these free-response event descriptions. The vast majority of these events (96%) fit into one of 16 categories (Figure 3) with over 50 participants, indicating that our life events checklist effectively captured the wide variety of personality-impacting events.

Overall, loss-related events were mentioned more frequently than gain-related events, consistent with theories that emphasize the salience of negativity (Baumeister et al., 2001). Furthermore, love-related events were mentioned more frequently than work-related events, highlighting the salience of relationships for perceived personality change (Sullivan, 2013). We do not believe that these findings are artifacts of offering relatively more love-related or loss-related event categories for participants to choose from, as participants first responded to a free-response prompt about the event before categorizing it.

As this survey was administered in December 2020, during the COVID-19 pandemic, we also reviewed free-response options to gauge

Figure 1

Year That the Event That Most Impacted Personality Was Reported to Occur ($N = 3,474$)



the extent to which this disease was perceived as a cause of personality change. Only 23 participants (0.4% of the sample) mentioned terms matching “coron*,” “pandem*,” or “covid,” indicating that most of the events mentioned by participants were not directly associated with COVID-19, even events in the category of health problems.

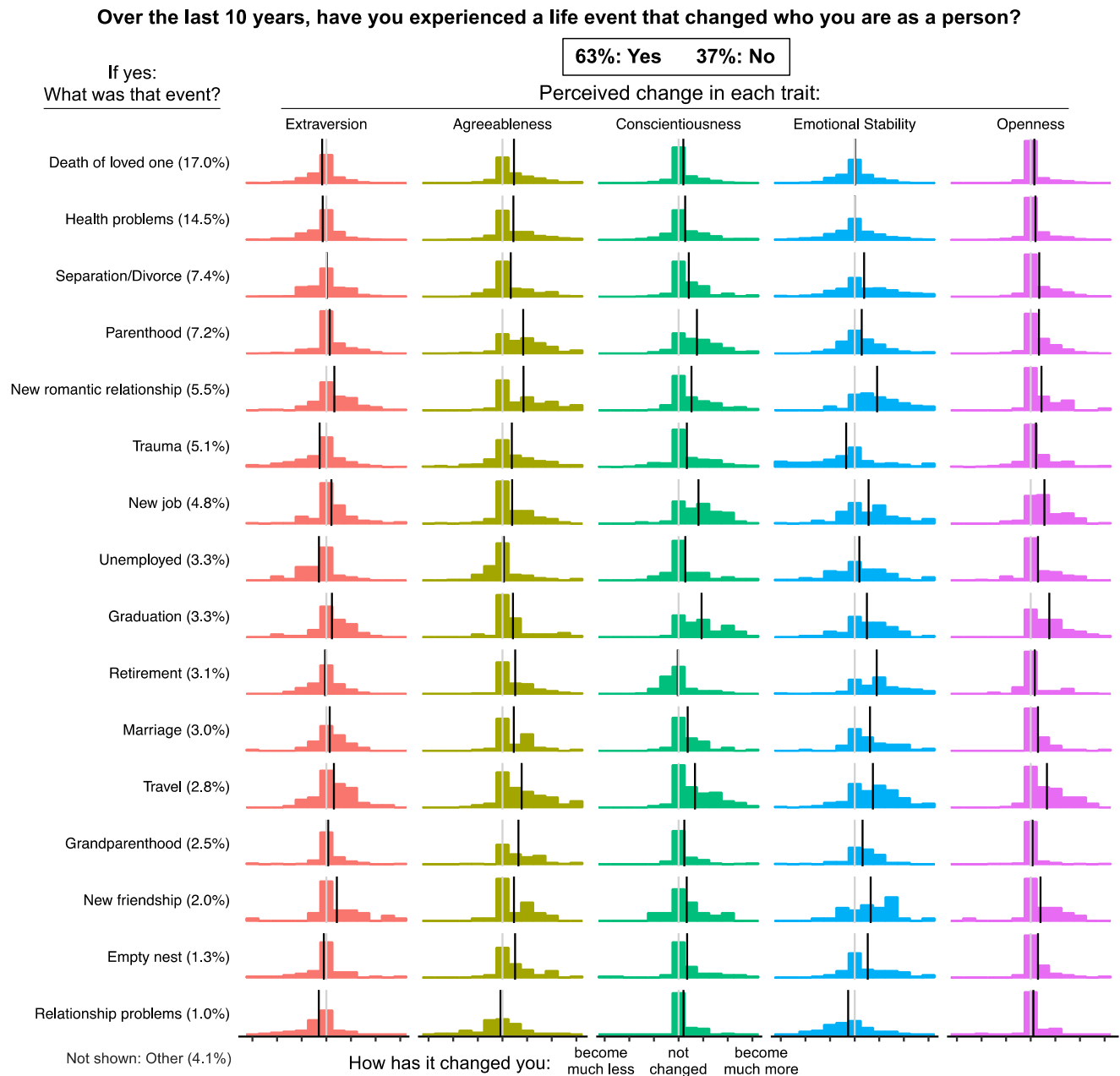
How Do People Believe Events Have Changed Their Personality Traits?

We then examined participants’ beliefs about how their personalities were affected by those life events they had indicated as relevant. Because participants were asked to identify an event that “changed who (they) are as a person,” some participants may have perceived changes in other aspects of the self (e.g., identity or goals) but not in their Big Five personality traits. Indeed, 278 of the 3,474 participants (7.9%) who responded that an event changed them “as a person” reported “I have not changed” to all 10 personality change perception items. Overall, participants who believed that they changed in one Big Five trait were slightly more likely to believe that they also changed in other traits (mean $r = .24$; Table 1). Across all events, participants indicated slight decreases in extraversion ($d = -0.06$) on average, and larger increases in the other Big Five traits (agreeableness $d = 0.47$, conscientiousness $d = 0.41$, emotional stability $d = 0.18$, openness $d = 0.38$; see online Supplemental Materials, for all standardized results).

In Figure 3, we display the distribution of perceived personality change for each event. Events had a heterogenous effect on perceived personality change: people who experienced the same personality-changing event reported different patterns of personality change. Perceived trait changes from parenthood, trauma, and travel were especially varied, as seen in the wide distribution of responses. Perceived change in extraversion was greatest among those whose most impactful event was a new friendship ($d = .52$) or new romantic relationship ($d = .40$), perceived change in agreeableness was greatest for new relationships ($d = .83$) and parenthood ($d = .81$), perceived change in conscientiousness was greatest for graduation ($d = 1.04$) and starting a new job ($d = .90$), perceived change in emotional stability was greatest for a new romantic relationship ($d = .82$) and retirement ($d = .80$), and perceived change in openness was greatest for graduation ($d = 1.06$) and travel ($d = .92$; see online Supplemental Materials, for all standardized perceptions of change). These perceptions, though especially large in magnitude, are remarkably consistent in direction with theoretical links between life events and change in specific traits (e.g., Bleidorn et al., 2018), with one counterintuitive exception: Those who reported death of a loved one/family member as their most impactful event did not perceive decreases in emotional stability, on average ($d = .02$).

Which Event Characteristics Do People Believe Caused Personality Change?

Next, we examined the perceived event characteristics that people believed caused their personality trait change. As shown in Figure 4, there were again high levels of heterogeneity in perceived change-inducing characteristics for each event. Even for events as negatively valenced as trauma, death of a loved one, and health problems, a substantial number of participants reported that their personality was not impacted because of the negativity of the event. Furthermore, different events were associated with distinct profiles

Figure 3Perceived Personality Trait Change From Life Events ($N = 5,513$)

Note. Participants first described the event that affected them most and then selected the event's category from a list. Event categories are ordered by frequency. Percentages in the left column describe the total frequency of responses across all participants, including those who reported no event-related change. Vertical gray lines depict a response of 0 (no change). Vertical black lines depict the mean level of perceived change. See the online article for the color version of this figure.

events using data from the 3,281 participants who reported that they experienced a personality-changing life event in the past 10 years and provided personality trait data. To do this, we estimated a series of multilevel models, with personality trait measurements nested within participants. For each participant, we centered time (t) in terms of years from life event, with $t = 0$ corresponding to the year in which the participant reported that the event happened. This led to a total coverage

of 22 years, ranging from $t = -12$ (a personality trait measurement 12 years before the event) to $t = 9$ (a personality trait measurement 9 years after the event). Sample size was largest in the year of the event ($t = 0$; $N = 1,935$). We present additional descriptive information organized in terms of years from life event in the [online Supplemental Materials](#).

Using this time-rescaled data, we estimated five baseline multilevel models (one for each Big Five trait, collapsed across

Table 1

Correlations Among Personality Trait Scores, Perceptions of Personality Change, and Perceptions of Change-Inducing Event Characteristics (N = 3,275–3,474)

Variable	Measured personality traits					Perceived event-related personality trait change					Perceived change-inducing event characteristics							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Extraversion	—																	
2. Agreeableness	.31	—																
3. Conscientiousness	.14	.31	—															
4. Emotional stability	.25	.07	.25	—														
5. Openness	.33	.27	.26	.19	—													
6. Δ Extraversion	.09	.01	.00	.05	.06	—												
7. Δ Agreeableness	.06	.07	.03	.06	.09	.22	—											
8. Δ Conscientiousness	.07	.03	.05	.03	.08	.17	.31	—										
9. Δ Emotional stability	.10	.02	.01	.22	.09	.36	.34	.25	—									
10. Δ Openness	.08	.05	.03	.04	.09	.23	.31	.46	.38	—								
11. Stressful	-.02	.10	.02	-.20	-.01	-.16	-.10	-.07	-.32	-.06	—							
12. Emotionally significant	.01	.18	.06	-.11	.08	-.09	.07	.00	-.14	.00	.43	—						
13. In hands of others	-.01	.00	-.03	-.11	-.03	-.08	-.10	.00	-.15	-.01	.30	.13	—					
14. Most people experience	-.02	-.01	-.02	-.05	-.06	.02	.06	-.01	.04	.03	.00	.13	.04	—				
15. Strong impact on life	.01	.12	.01	-.12	.07	-.04	.05	.07	-.05	.06	.24	.37	.10	.10	—			
16. Unexpected	-.01	.04	.04	-.05	-.03	-.14	-.05	-.03	-.21	-.05	.37	.20	.20	-.02	.16	—		
17. Reputation suffered	-.04	-.11	-.12	-.19	-.06	-.11	-.14	-.07	-.16	-.05	.24	.03	.34	.04	.08	.18	—	
18. Negative	-.03	.04	.03	-.11	-.04	-.26	-.20	-.19	-.41	-.19	.54	.21	.18	-.09	.03	.47	.22	—
19. Changed worldviews	.01	-.02	-.05	-.18	.00	-.04	.04	.06	-.06	.11	.25	.17	.23	.10	.27	.18	.33	.14

Note. Personality trait scores are aggregated across waves. Correlations $\geq |.15|$ in magnitude are bolded.

all life events) to examine personality trait development before and after a major life event (Luhmann & Eid, 2009; Schwaba & Bleidorn, 2019; Yap et al., 2012). Each baseline model included three random, individually varying parameters: an overall intercept that described personality trait levels in the year of the event ($t = 0$), a linear preevent slope (for $t < 0$), and a linear postevent slope (for $t > 0$). These linear slopes capture development before and after the event in terms of continuous, constant developmental trajectories that reflect gradually unfolding long-term effects. By incorporating measurements throughout the entire postevent period and aggregating change into a single parameter, this parameterization maximizes power for estimating associations with perceived change but may be an overly simplistic representation of the underlying change process, an issue we revisit in the discussion. This model can be written as:

$$\text{Traitscore}[t]_i = y_{0i} + y_{1i} \cdot \text{preSlope}[t] + y_{2i} \cdot \text{postSlope}[t] + e[t]_i, \quad (1)$$

At Level 1, where $\text{Traitscore}[t]_i$ is the personality trait score of participant i at time t , y_{0i} is the personality trait score of participant i in the year that the event happened, y_{1i} is a slope representing linear preevent change in the personality trait of participant i , $\text{preSlope}[t]$ is a negative number indicating the years before the event occurred in year t , y_{2i} is a slope representing linear postevent change in the personality trait of participant i , $\text{postSlope}[t]$ is a positive number indicating the years after the event occurred in year t , and $e[t]_i$ is the error score of participant i at time t . Because we estimated the intercept, preevent slope, and postevent slope as random, individually varying variables, we can write the Level 2 equations in this model as follows:

$$y_{0i} = \mu_0 + e_{0i}, y_{1i} = \mu_1 + e_{1i}, y_{2i} = \mu_2 + e_{2i}, \quad (2)$$

where the intercept, preevent slope, and postevent slope have fixed group means (μ_{0-2}) and participant-specific residuals (e_{0i-2i}) with their own variance components. We present a visualization of this model in the online Supplemental Materials.

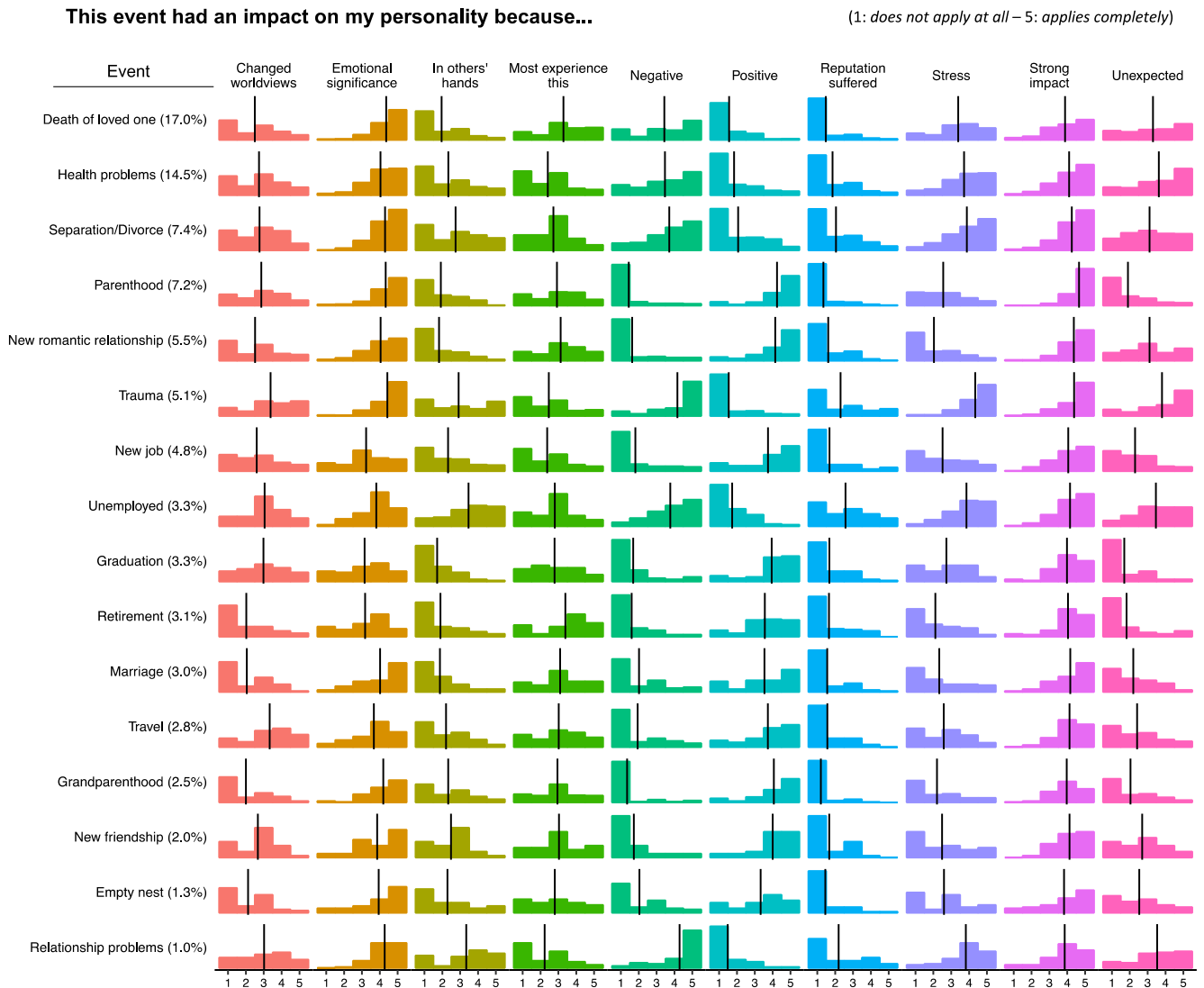
We then extended these basic models to test our first set of hypotheses. First, we examined (Hypothesis 1a) whether perceptions of event-related personality trait change were significantly associated with personality trait change in the years following the event. To do this, we estimated multilevel models that tested the association between perceived event-related trait change and the postevent trait slope. This can be written by modifying the Level 2 equation above in the following manner:

$$y_{2i} = \mu_{20} + y_{21} \cdot \text{perceivedChange} + e_{2i}, \quad (3)$$

where the postevent slope has a fixed group mean (μ_{20}), a coefficient estimating the effect of perceived event-related change (perceivedChange) on postevent slope (y_{21}), and the remaining residual deviation of participant i 's postevent slope from the mean slope (e_{2i}). A significant positive value of y_{21} would indicate that participants who perceived greater relative increases in a trait following a personality-changing life event tended to show relatively greater yearly increases in that trait in the years following the event. We then tested Hypothesis 1b by estimating associations between perceived event-related trait change and preevent personality slope, as in the equation above, and Hypothesis 1c by estimating the association between perceived event-related trait change and personality levels in the year of the event.

Results of these analyses showed strong support for Hypothesis 1a: Participants who perceived greater increases in each of the Big Five traits showed greater relative linear increases in each of those traits across the years following the event (Table 2). To contextualize these effects, we estimated model-implied correlations

Figure 4
Perceptions of 10 Change-Inducing Event Characteristics by Life Event (N = 3,467)



Note. Events are ordered by frequency. Percentages describe the total frequency of responses across all participants, including those who reported no change from an event. Vertical black lines depict the mean response. We omitted the category other (4.1% of participants). See the online article for the color version of this figure.

between postevent change and perceptions of change, standardizing their covariance by dividing them by the product of their model-implied standard deviations. Overall, participants were perceptive of their past measured change, on average (mean r between perceived and actual change = .22; Table 2). Correspondence was highest between perceived and measured emotional stability change ($r = .30$). Considering that this event happened, on average, 5 years in the past, it is remarkable to us how strongly perceptions corresponded with measured trends in personality trait change following that date.

We also found significant consistency between perceptions of event-related change and measured preevent change, supporting Hypothesis 1b (Table 2). For all traits except agreeableness, participants who perceived greater event-related increases showed greater trait increases in the years preceding the event ($p < .010$).

The average correspondence across traits was $r = .16$, smaller in magnitude than correspondence with postevent change but still a medium-sized effect (Funder & Ozer, 2019). This finding suggests that perceptions of event-related change did not solely correspond to postevent change—for many participants, change (also) occurred as they approached the event, and their post hoc recollections of event-related change may incorporate this time period.

Finally, we estimated associations between perceptions of change and measured levels of personality in the year that the focal event occurred. For each trait, we found a correspondance effect where participants perceived each event in line with their trait score in the year of the event, for example, highly extraverted participants (at time of the event) perceived the event as making them more extraverted. These effects were weaker for agreeableness and conscientiousness.

Table 2
Associations Between Perceived and Measured Personality Trait Change Before, During, and After a Personality-Changing Life Event (N = 3,275–3,281, 15,876 Observations)

Change parameter	Trait	B with perceived change	r with perceived change	p	99% B CI
Postevent change (up to 10 years)	Ext.	0.012	.237	<.001	[0.006, 0.018]
	Agr.	0.012	.227	<.001	[0.006, 0.019]
	Con.	0.010	.170	<.001	[0.003, 0.016]
	Emo. Sta.	0.020	.296	<.001	[0.013, 0.027]
	Ope.	0.007	.162	.003	[0.001, 0.013]
Postevent change (2 years after event)	Ext.	0.017	.275	.025	[-0.003, 0.037]
	Agr.	0.000	.002	.984	[-0.022, 0.023]
	Con.	0.033	.238	<.001	[0.010, 0.056]
	Emo. Sta.	0.047	.371	<.001	[0.024, 0.070]
	Ope.	0.017	.187	.051	[-0.005, 0.040]
Preevent change	Ext.	0.007	.127	.001	[0.001, 0.012]
	Agr.	0.006	.106	.014	[-0.000, 0.012]
	Con.	0.009	.150	<.001	[0.003, 0.015]
	Emo. Sta.	0.017	.256	<.001	[0.010, 0.023]
	Ope.	0.007	.155	.002	[0.001, 0.013]
Levels in year of event	Ext.		.094	<.001	[0.051, 0.138]
	Agr.		.058	<.001	[0.017, 0.099]
	Con.		.058	<.001	[0.017, 0.099]
	Emo. Sta.		.226	<.001	[0.185, 0.268]
	Ope.		.112	<.001	[0.070, 0.153]

Note. Ext. = extraversion; Agr. = agreeableness; Con. = conscientiousness; Emo. Sta. = emotional stability; Ope. = openness to experience; CI = confidence interval. Bolded associations are significant at $p < .01$. *B* indicates associations between standardized perceptions of change and year-to-year change pre/post-event (e.g., a *B* of .012 indicates that, on average, participants who perceived 1 *SD* greater change in extraversion increased .012 *SD* more in extraversion per year). *r* indicates model-implied correlations between perceived and measured change (e.g., an *r* of .237 indicates a moderate association between participants' perceived extraversion change and their linear measured change in extraversion in the years following the event).

Short-term effects of events may be overlooked when trait development is modeled in terms of long-term linear change over up to 10 years. In requested revisions, we explored the associations between perceptions of change and measured change in the 2 years after the event, allowing us to capture more ephemeral effects. As shown in Table 2, correlations between perceptions of trait change and measured trait change in the short term were similar in magnitude to correlations with long-term development for all traits besides agreeableness, indicating that people's retrospective perceptions of event-related change were associated with both short-term and long-term personality development. For agreeableness, perceptions of change and measured change in the 2 years following the event were uncorrelated ($r = .002$, $p = .984$); associations between perceived and measured change only emerged when considering agreeableness development over the full 10 years following the event ($r = .227$, $p < .001$).

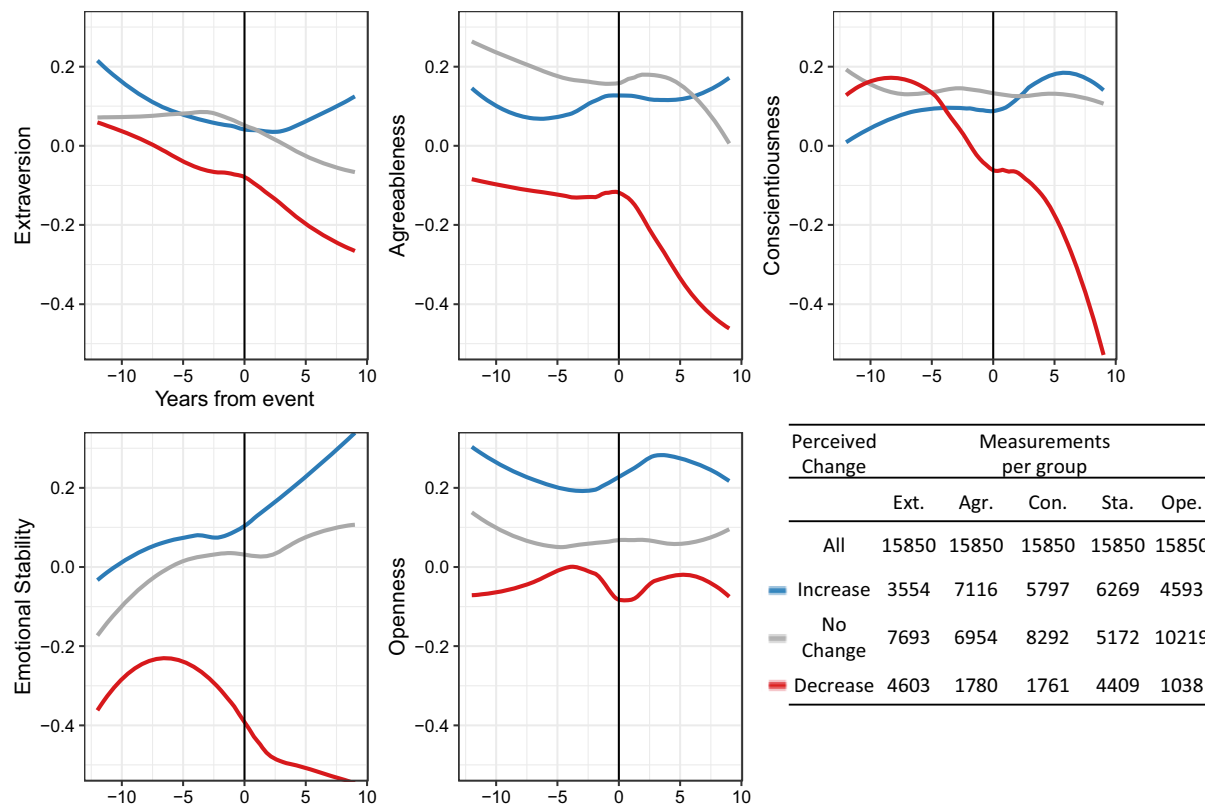
To further investigate associations between perceived and measured event-related change while imposing minimal constraints on developmental trajectories, we visualized measured personality change at different levels of perceived personality change (Figure 5) by estimating a series of locally estimated smoothed trajectories. Participants were sorted into three groups: increase (perceived change between one and six), no change (perceived change zero), and decrease (perceived change between -1 and -6). This sorting was done to maximize the sample size of each group and was not preregistered. In the online Supplemental Materials, we include visualizations with participants split into five groups instead of three to illustrate differences in degree between participants who perceived major and minor

trait changes. We also visualized development in the $N = 1,980$ participants who indicated that no recent life event had affected their personality traits. These participants showed little change over time on average and differed in personality and demographics from those who reported that they did experience an event. Specifically, in 2015 (the average year of reported personality-changing life events), participants who indicated that no event affected their personality scored significantly lower in agreeableness ($d = -0.61$, 95% CI [-1.04, -0.18], $p = .006$), tended to be male (52.9% vs. 43.1%, $p < .001$), and older ($M_{\text{age}} = 56.8$ vs. 50.0, $p < .001$), and were less likely to have a junior college education or beyond (55.6% vs. 68.8%, $p < .001$).

In each figure, the match between perceptions of life events and measured development following life events is visually apparent: as tested in Hypothesis 1a–c, participants who perceived greater event-related trait increases tended to increase in that trait to a greater extent following the event, before the event (except for in agreeableness), and scored higher on that trait in the year of the event. This correspondence is clearest for extraversion and emotional stability, the two traits with the greatest between-person variance in perceived change (and thus the most precise estimate for development among participants who reported high levels of change). These figures also reveal how event-related development must be considered in light of other developmental trends: even participants who reported that the event did not affect their emotional stability tended to increase in this trait over time, and even those who reported no event-related change in extraversion or agreeableness tended to decrease in these traits over time.

Figure 5

Locally Estimated Smoothed Trajectories of Big Five Change Among Those Who Perceived Trait Increases, No Trait Change, or Trait Decreases



Note. Traits are standardized ($M = 0$, $SD = 1$). See [online Supplemental Materials](#) for figures with participants separated into five groups. Ext. = extraversion; Agr. = agreeableness; Con. = conscientiousness; Sta. = stability; Ope. = openness to experience. See the online article for the color version of this figure.

Hypothesis 2: For Specific Events, Are Perceptions of Event-Related Personality Trait Change Consistent With Measured Personality Trait Change in the Years Following an Event?

Next, we tested our second set of hypotheses: among only participants who indicated that their personality was most affected by two specific life events—loss of a loved one/family member or health problems—are retrospective perceptions of event-related personality change predictive of measured change in the years after the event? We chose these two events because > 500 participants indicated that these events affected their personality traits. Testing the correspondence between perceived and measured change in the context of these specific life events allowed us to examine whether accounting for perceived change can illuminate some of the heterogeneity in development surrounding these events.

To do this, we estimated the same multilevel model as we used to test Hypothesis 1a while restricting our sample to (Hypothesis 2a) only participants who indicated that their personality traits changed from loss of a loved one/family member ($N = 885$ that also provided personality trait information; $M_{\text{age}} = 54.81$, $SD_{\text{age}} = 18.03$, 58% female) and (Hypothesis 2b) only participants who indicated that their personality traits changed from health problems ($N = 768$ that

also provided personality trait information; $M_{\text{age}} = 55.19$, $SD_{\text{age}} = 17.28$, 55% female). We then estimated associations between perceived event-related trait change and Big Five personality trait change following the event in the same way that we tested Hypothesis 1a. We present the results of these analyses in [Table 3](#).

Results indicated that, among participants who indicated changes from loss of a loved one or family member, those who perceived greater declines in agreeableness, emotional stability, and openness showed greater measured declines in these traits in the years following the event. These perceptions were, on average, quite strongly linked to measured change (mean $r = .42$). However, perceptions of change in extraversion and conscientiousness were not significantly associated with postevent measured change. We found a similar pattern of results for participants who indicated changes from health problems: Those who perceived greater declines in extraversion, agreeableness, and emotional stability, but not conscientiousness or openness, tended to show greater declines in those traits after experiencing the event.

For both events, we visualized the average developmental trajectory among all participants who indicated the event alongside trajectories at different levels of perceived change (see [online Supplemental Materials](#), for results across all traits). These figures reveal the information gained by considering perceptions of change

Table 3
Associations Between Perceived and Measured Postevent Personality Change in the Two Most Commonly Experienced Personality-Affecting Events

Event	Trait	<i>B</i> with perceived change	<i>r</i> with perceived change	<i>p</i>	99% <i>B</i> CI
Loss of loved one/family <i>N</i> = 885 4,411 measurements	Ext.	0.006	.177	.141	[-0.005, 0.018]
	Agr.	0.015	.351	.001	[0.003, 0.026]
	Con.	0.006	.130	.218	[-0.007, 0.019]
	Sta.	0.026	.409	<.001	[0.012, 0.041]
Health problems <i>N</i> = 768 4,159 measurements	Ope.	0.013	.492	.003	[0.002, 0.024]
	Ext.	0.017	.400	<.001	[0.006, 0.029]
	Agr.	0.012	.330	.009	[0.000, 0.024]
	Con.	0.012	.199	.011	[0.000, 0.024]
	Sta.	0.018	.271	.001	[0.004, 0.031]
	Ope.	0.005	.120	.255	[-0.006, 0.015]

Note. Ext. = extraversion; Agr. = agreeableness; Con. = conscientiousness; Sta. = stability; Ope. = openness to experience; CI = confidence interval. *B* indicates associations between standardized perceptions of change and change pre/post-event (measured in standard deviations per year). *r* indicates standardized associations between perceived and measured change. Bolded findings are significant at $p < .01$.

in the context of the event, which we illustrate for emotional stability and conscientiousness (Figure 6).

Participants who indicated trait changes from loss of a loved one or family member increased in emotional stability, on average, after the event ($B = 0.019$, $p < .001$), whereas those who experienced health problems did not, on average, show significant emotional stability change ($B = 0.009$, $p = .14$). However, these estimates for average change mask a wide and systematic pattern of individual differences: participants who perceived that losing a loved strongly decreased their emotional stability indeed declined in this trait by nearly a full standard deviation during the years following the event, whereas participants who reported high amounts of postevent increases in emotional stability increased about half a standard deviation in this trait. Beyond directionality, participants were also attuned to their magnitude of change: Those who perceived minor increases or decreases changed to a lesser extent than those who perceived major increases or decreases. These strong interaction effects provide preregistered evidence that losing a loved one or family member and having health problems are associated with emotional stability development, but in different ways across different people, and that participants' perceptions of these events were consistent with their measured change following the event. An investigation of mean-level change, even among people who reported that this event had a major effect on their personality development, would overlook these nuanced effects; in fact, the mean emotional stability trajectory roughly mirrored the trajectory of those who perceived no change from the event.

For conscientiousness, however, little information was gained by considering perceptions of change, indicating that health problems and loss of a loved one/family member may be less relevant to development in this trait. For both events, the average postevent measured conscientiousness change was small and nonsignificant (loss of loved one $B = -0.005$, $p = .27$; health problems $B = -0.003$, $p = .54$). Unlike emotional stability, retrospective perceptions of conscientiousness change were not associated with measured trajectories, and as seen in Figure 6, conscientiousness trajectories were not systematically ordered across levels of perceived change, and indeed clustered more tightly around the mean than did emotional stability trajectories. This lack of correspondence suggests

that, both in terms of average and individual effects, participants who perceived personality change resulting from health problems or losing a loved one/family member did not systematically change in conscientiousness.

Hypothesis 3: Are Perceived Change-Inducing Event Characteristics Associated With Measured Personality Trait Change Before and After an Event?

Finally, to test our third set of hypotheses (Hypotheses 3a–c), we explored how perceived change-inducing event characteristics were associated with past measured personality change. These tests allow us to identify potential psychologically salient event components that can help researchers identify common psychological ingredients of change across different events. To do this, we repeated the analysis structure of Hypotheses 1a–c, substituting in perceived change-inducing event characteristics for perceptions of trait change. Across all combinations of the nine event characteristics, five Big Five traits, and three temporal parameters (pre-, post-, and year-of-), this resulted in 135 tests.

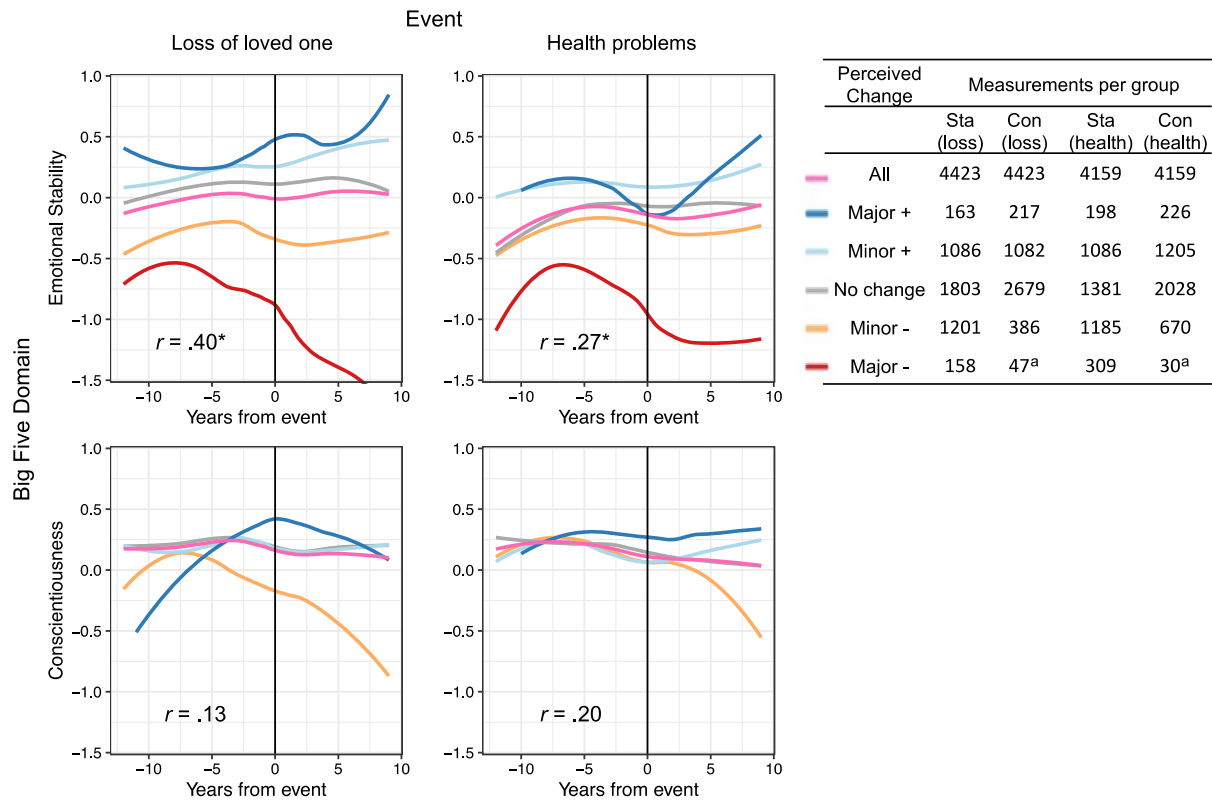
Overall, 33 of these 135 associations between change-inducing event characteristics and perceptions of change were significant at $p < .01$ (Table 4). Nine of these associations were linked to changes prior to the event. In the years leading up to the event, participants declined more in emotional stability when they perceived that the event impacted them because it was stressful, emotionally significant, in the hands of others, strongly impactful, hurt their reputation, negative, and changed their worldviews. They increased more in agreeableness to the extent that the event was emotionally significant, and they decreased more in conscientiousness to the extent that the event was negative.

Only three significant associations involved postevent development. In the years after the event, participants declined more in emotional stability when they perceived that the event impacted them because it was stressful, hurt their reputation, and negative.

The remaining 21 significant associations were correlations between change-inducing event characteristics and the intercept (personality trait levels in the year the event occurred). These associations were mostly redundant with the zero-order correlations

Figure 6

Personality Development Stratified by Perceived Change Among Participants Who Experienced Loss of a Loved One/Family Member or Health Problems: Perceptions Disambiguate Trajectories of Emotional Stability but Not Conscientiousness



Note. Correlations describe multilevel model associations between postevent linear development trajectories and perceptions of event-related change (Table 3). As there were fewer than 100 measurements among participants who reported major decreases in conscientiousness, we did not visualize these trajectories (see online Supplemental Materials, for all trait trajectories). Con. = conscientiousness; Sta. = stability. See the online article for the color version of this figure.

^a We did not visualize perceived major decreases in conscientiousness due to small sample size (<100 measurements).

* $p < .01$.

between personality trait scores and perceptions presented in Table 1 that we described in Study 1.

In general, these findings linking perceived change-inducing event characteristics to measured personality trait development revealed that many event characteristics were linked to the development of emotional stability, in intuitive ways that are aligned with existing theory. These effects were medium to small on average (mean $r = |.13|$). And though perceptions of why the event affected personality were associated with agreeableness, conscientiousness, and openness levels in the year of the event, perceptions were not associated with prior or subsequent development in these traits.

Discussion

In this study, we measured retrospective perceptions of personality change following a life event and connected them to measured personality development in the years before and after that event. We found that participants differed greatly in their beliefs about event-related change and that these perceptions were linked robustly to measured change before and after the event: Associations between perceived and measured change were significant across

traits, across events, and also among subsets of participants who reported on loss of a loved one or family member and health problems. Overall, we hope these results help resolve a major paradox in the field: How is it that both academics and laypeople believe that life events affect personality development, yet past research has failed to find robust links between life events and personality change (Bleidorn et al., 2020; Jackson & Beck, 2021; Jayawickreme et al., 2021; Luhmann et al., 2021)? The answer might lie in moving beyond the study of mean-level change and instead describing development in terms of the heterogeneous experiences that each life event can bring. By allowing people to tell us if, when, how, and why they were affected by a life event, we may be better able to identify meaningful signals of event-related personality change that go well beyond average effects.

Insights From Beliefs About Event-Related Personality Change

In Part 1 of this study, we examined participants' beliefs about personality trait change in response to life events. We found a

Table 4
Associations Between Perceptions of Change-Inducing Event Characteristics and Measured Big Five Development ($N = 3,275, 15,876$ Observations)

Event characteristic	Trait	Preevent development				Year-of-event trait correlations				Postevent development			
		<i>b</i>	<i>B</i>	<i>p</i>	99% CI	<i>r</i>	<i>p</i>	99% CI	<i>b</i>	<i>B</i>	<i>p</i>	99% CI	
Stress	Ext.	0.000	-0.008	.837	[-0.005, 0.005]	-.027	.110	[-.069, .016]	-0.001	-0.014	.742	[-0.007, 0.005]	
	Agr.	0.001	0.018	.656	[-0.005, 0.007]	.098	<.001	[.057, .139]	0.000	0.005	.923	[-0.006, 0.007]	
	Con.	-0.004	-0.061	.111	[-0.009, 0.002]	-.006	.704	[-.046, .034]	-0.002	-0.036	.407	[-0.008, 0.004]	
Emotionally significant	Emo. Sta.	-0.012	-1.323^a	<.001	[-0.016, -0.008]	-.194	<.001	[-.235, -.153]	-0.010	-0.125	.745	[-0.017, -0.002]	
	Ope.	0.002	0.034	.436	[-0.004, 0.007]	-.015	.349	[-.056, .026]	0.001	0.018	.001	[-0.005, 0.007]	
	Ext.	0.002	0.038	.315	[-0.003, 0.007]	.013	.434	[-.030, .056]	0.000	0.004	.926	[-0.006, 0.006]	
In the hands of others	Agr.	0.006	0.118	.005	[0.000, 0.012]	.172	<.001	[.132, .213]	0.004	0.081	.092	[-0.002, 0.011]	
	Con.	0.000	0.005	.905	[-0.006, 0.006]	.053	<.001	[.013, .094]	0.001	0.011	.805	[-0.006, 0.007]	
	Emo. Sta.	-0.010	-0.99^a	<.001	[-0.014, -0.006]	-.097	<.001	[-.139, -.055]	-0.003	-0.045	.220	[-0.011, 0.004]	
Most people expected this	Ope.	0.002	0.041	.354	[-0.003, 0.007]	.079	<.001	[.038, .120]	0.001	0.025	.645	[-0.005, 0.007]	
	Ext.	-0.002	-0.033	.377	[-0.007, 0.003]	-.012	.489	[-.054, .031]	-0.002	-0.037	.385	[-0.008, 0.004]	
	Agr.	-0.002	-0.029	.479	[-0.007, 0.004]	-.009	.572	[-.05, .032]	0.001	0.042	.384	[-0.004, 0.009]	
Strong impact	Con.	-0.002	-0.042	.274	[-0.008, 0.003]	-.043	.006	[-.084, -.003]	-0.002	-0.024	.586	[-0.008, 0.005]	
	Emo. Sta.	-0.007	-0.102	.004	[-0.013, -0.001]	-.100	<.001	[-.142, -.059]	-0.003	-0.050	.219	[-0.010, 0.004]	
	Ope.	-0.002	-0.053	.229	[-0.007, 0.003]	-.035	.027	[-.076, .006]	-0.001	-0.012	.827	[-0.006, 0.005]	
Unexpected	Ext.	-0.001	-0.027	.481	[-0.006, 0.004]	-.010	.551	[-.053, .033]	-0.002	-0.033	.443	[-0.008, 0.004]	
	Agr.	0.000	-0.004	.926	[-0.006, 0.005]	-.013	.424	[-.054, .028]	-0.002	-0.037	.438	[-0.009, 0.005]	
	Con.	0.002	0.029	.448	[-0.004, 0.007]	-.015	.345	[-.055, .026]	-0.006	-0.099	.026	[-0.012, 0.001]	
Rep suffered	Emo. Sta.	0.001	0.010	.777	[-0.005, 0.007]	-.029	.070	[-.071, .012]	0.002	0.037	.361	[-0.004, 0.009]	
	Ope.	-0.001	-0.027	.538	[-0.006, 0.004]	-.054	.001	[-.095, -.013]	-0.003	-0.064	.241	[-0.009, 0.003]	
	Ext.	-0.001	-0.015	.687	[-0.006, 0.004]	.007	.691	[-.036, .049]	-0.001	-0.015	.738	[-0.007, 0.005]	
Negative	Agr.	0.003	0.064	.114	[-0.002, 0.009]	.106	<.001	[.065, .147]	0.003	0.054	.270	[-0.004, 0.010]	
	Con.	0.001	0.024	.525	[-0.004, 0.007]	.017	.266	[-.023, .058]	0.003	0.051	.260	[-0.004, 0.009]	
	Emo. Sta.	-0.008	-0.114	.001	[-0.013, -0.002]	-.125	<.001	[-.166, -.083]	-0.002	-0.033	.474	[-0.009, 0.005]	
Changed worldviews	Ope.	0.001	0.017	.688	[-0.004, 0.006]	.061	<.001	[.020, .101]	0.001	0.033	.552	[-0.005, 0.007]	
	Ext.	0.001	0.019	.615	[-0.004, 0.006]	-.013	.439	[-.056, .030]	-0.001	-0.026	.555	[-0.007, 0.005]	
	Agr.	-0.001	-0.017	.675	[-0.007, 0.005]	.036	.023	[-.005, .078]	-0.003	-0.054	.260	[-0.010, 0.004]	
Rep suffered	Con.	-0.005	-0.080	.035	[-0.010, 0.001]	.020	.202	[-.020, .060]	-0.001	-0.024	.590	[-0.008, 0.005]	
	Emo. Sta.	-0.005	-0.070	.048	[-0.011, 0.001]	-.043	.008	[-.085, -.001]	-0.004	-0.065	.110	[-0.011, 0.003]	
	Ope.	0.000	-0.001	.986	[-0.005, 0.005]	-.031	.048	[-.072, .010]	0.001	0.021	.709	[-0.005, 0.007]	
Negative	Ext.	0.000	0.008	.840	[-0.005, 0.005]	-.039	.020	[-.082, .004]	-0.005	-0.093	.031	[-0.011, 0.001]	
	Agr.	-0.001	-0.028	.503	[-0.007, 0.004]	-.106	<.001	[-.148, -.065]	-0.005	-0.086	.072	[-0.011, 0.002]	
	Con.	-0.003	-0.043	.264	[-0.008, 0.003]	-.119	<.001	[-.159, -.078]	-0.003	-0.048	.283	[-0.009, 0.004]	
Negative	Emo. Sta.	-0.009	-0.136	<.001	[-0.015, -0.003]	-.187	<.001	[-.228, -.145]	-0.008	-0.115	.004	[-0.015, -0.001]	
	Ope.	0.000	-0.006	.892	[-0.005, 0.005]	-.058	<.001	[-.100, -.017]	-0.001	-0.023	.667	[-0.007, 0.005]	
	Ext.	0.000	0.001	.986	[-0.005, 0.005]	-.035	.035	[-.078, .008]	0.000	-0.008	.865	[-0.006, 0.006]	
Changed worldviews	Agr.	0.000	-0.005	.913	[-0.006, 0.006]	.040	.012	[-.001, .082]	-0.001	-0.023	.636	[-0.008, 0.006]	
	Con.	-0.008	-0.141	<.001	[-0.014, -0.002]	.010	.528	[-.031, .051]	-0.006	-0.105	.020	[-0.012, 0.001]	
	Emo. Sta.	-0.011	-0.164	<.001	[-0.017, -0.004]	-.097	<.001	[-.139, -.055]	-0.008	-0.118	.004	[-0.015, -0.001]	
Negative	Ope.	-0.001	-0.018	.700	[-0.006, 0.004]	-.051	.002	[-.092, -.009]	-0.001	-0.022	.693	[-0.007, 0.005]	
	Ext.	0.002	0.032	.394	[-0.003, 0.007]	.001	.944	[-.042, .044]	-0.001	-0.018	.675	[-0.007, 0.005]	
	Agr.	0.002	0.031	.450	[-0.004, 0.007]	-.019	.245	[-.060, .023]	0.000	0.005	.924	[-0.006, 0.007]	
Negative	Con.	0.001	0.022	.562	[-0.004, 0.007]	-.056	<.001	[-.097, -.016]	0.000	-0.008	.851	[-0.007, 0.006]	
	Emo. Sta.	-0.008	-0.114	.001	[-0.014, -0.002]	-.202	<.001	[-.243, -.161]	-0.002	-0.023	.568	[-0.009, 0.005]	
	Ope.	0.001	0.030	.495	[-0.004, 0.006]	.014	.379	[-.027, .055]	0.000	0.002	.972	[-0.006, 0.006]	

Note. Ext. = extraversion; Agr. = agreeableness; Con. = conscientiousness; Emo. Sta. = emotional stability; Ope. = openness to experience; CI = confidence interval. *B* indicates associations between standardized perceptions of change and change pre/post-event (measured in standard deviations per year). *r* indicates standardized associations between perceived and measured change. Bolded results are significant at $p < .01$.

^aTwo cases where the model did not converge acceptably due to singular fit (very high collinearity between trait development and perceived reasons for change); we refrain from substantive interpretation of these standardized estimates.

marked degree of heterogeneity at all points of analysis. For example, most participants—63%—indicated that a life event had affected who they are as a person in the last 10 years, in line with recent research that surveyed beliefs about hypothetical life events (Rakhshani et al., 2022), but leaving a substantial 37% of participants who did not perceive recent event-related personality change. Events from 16 different categories were nominated as most impactful by 50 or more participants, indicating that participants perceived change was caused by a wide set of events. Past research has highlighted how some life events, such as divorce, may proceed differently for different people and thus have varying effects on personality development (Amato, 2000; Bleidorn et al., 2020). We thus expected to find individual differences in perceived personality change within some events, but the sheer amount of variation was remarkable. For nearly every combination of trait and event, some participants reported increases, others reported decreases, and others reported no change. Even participants who experienced the same event and reported that it had affected the same trait often attributed this change to different causes, as seen in the low correlations between perceptions of trait change and event characteristics. In line with previous research (Kritzler et al., 2022), these findings indicate that nearly all life events were perceived quite heterogeneously: Life events unfold quite differently for different people, resulting in vastly different perceived effects on personality (Bleidorn et al., 2020; Jayawickreme et al., 2021; Luhmann et al., 2021).

Additionally, results generally indicated consensus between theoretical predictions and lay beliefs about how life events may affect personality. Though participants reported on a wide variety of change-inducing events, they sorted 95% of those events into the 16 event categories we provided, suggesting that researchers and research participants agree on which life events might most commonly impact personality (Dohrenwend, 2006). Furthermore, the average perceived change in response to personality-changing life events was highly consistent with theoretical accounts of how life events affect personality—our sample agreed with academic perspectives that travel may bolster openness, new relationships can influence agreeableness, and employment often leads to increases in conscientiousness (Bleidorn et al., 2018; Wagner et al., 2020).

An open theoretical question addressed by this study involves the structure of perceived personality change. Modern perspectives on personality development often link commonly experienced life events, such as entering the workforce or becoming a parent, to change in many personality traits (e.g., Golle et al., 2019; Specht et al., 2014), but it is unclear whether change in different traits occurs (and is perceived) in a correlated, manifold manner, or independently of each other. We found relatively low intercorrelations between perceived change across Big Five traits, which indicated participants did not respond in a manifold manner that would have suggested they recalled the event in terms of a few broad features like overall impact or maturation. This finding, along with empirical research that has found only small levels of correlated change in personality traits across adulthood (Klimstra et al., 2013; Schwaba et al., 2022), provides emerging evidence for a complex, high-dimensional structure of perceived, and measured, personality change.

Finally, we found that perceived change-inducing event characteristics, like stress, reputational damage, and changing one's worldviews, were not strongly correlated with personality, underscoring the difficulty in understanding *why* life events affect personality traits. Specifically, for all traits but emotional stability,

people's perceptions of the event characteristics that caused them to change had small and inconsistent links with perceived personality change, measured personality change, and levels of personality traits in the year of the event. Past research, too, has found relatively little correspondence between personality trait levels and perceptions of event characteristics (Rakhshani et al., 2022). These small associations may be due to many reasons, including the nonspecificity of event characteristics (e.g., emotional significance could bring positive or negative change in nearly any trait), externality of event experiences (e.g., even a highly positive and extraverted person may be changed by an unexpectedly negative event), potential interactive effects (e.g., associations between stress and perceived trait change may be contingent on a person's individual interpretation of that stress), and the brevity of our questionnaire, which may have introduced measurement error. In any case, these results underscore that understanding the processes underlying psychological phenomena like event-related personality development can be especially difficult (Yarkoni & Westfall, 2017).

Perceived Change Matches Event-Related Development

In Part 2 of this study, we used participants' perceptions of event-related change to study a pressing question in the study of personality development: Why has evidence about effects of life events on personality change been so mixed? Recently, researchers have emphasized that different people may experience the same event in very different ways, creating heterogenous patterns of event-related personality trait change (Bleidorn et al., 2020; Jayawickreme et al., 2021; Luhmann et al., 2021). Thus, the effects of life events on personality trait change may emerge more clearly when matching change to participants' varying perceptions. Results of our analyses support these propositions. Perceptions were moderately to strongly correlated with measured personality trajectories leading up to the event (mean $r = .17$), across the 2 years following the event (mean $r = .28$), and up to 10 years following the event (mean $r = .22$). These estimates are similar in magnitude to past research that has examined correlations between perceived and measured change outside the context of events over varying lengths of time (mean $r \sim .20$; Bossert et al., 2022; Oltmanns et al., 2020; Robins et al., 2005).

These findings suggest that individual differences in event-related change are not developmental noise. Rather, they are a signal that events are associated with personality change, but the effects of events on personality vary across people in ways that are systematically consistent with their own perceptions of these events. We believe that future research on event-related personality change should focus more on assessing individually varying experiences within and across life events. Retrospectively, this can be done using questionnaires (e.g., see Luhmann et al., 2021) or through alternative assessment methods (such as life history interviews or open-ended narratives about event experiences). Researchers can also measure event experiences in the moment (using experience sampling methodology) and use these data to predict future trajectories. Even if such experiential data are not available, heterogeneity in developmental trajectories may be reduced if participants can be stratified into subgroups that are likely to experience an event in similar ways. Researchers can then use these data as a tool to disentangle and understand developmental heterogeneity, rather than continue to employ designs that consider all participants who experienced an event as part of one group.

We gained further information about the consistency between perceived and measured change by examining two specific events: health problems and loss of a loved one/family member. For each, we estimated mean-level trajectories and visualized them alongside trajectories at different levels of perceived event-related increases or decreases. This comparison tested another proposition of recent calls for research into individually varying event experiences: if event-related change varies substantially across people, mean-level effects on a certain trait may be attenuated because some people's trait increases negate other people's trait decreases. Our results support this hypothesis. On average, losing a loved one/family member or health problems was only weakly associated with personality trait development. But individual perceptions revealed the high level of developmental heterogeneity surrounding this average. For example, participants who experienced health problems and perceived increases in extraversion indeed increased substantially in this trait in the years following the event, whereas those who perceived decreases showed developmental decreases. These findings effectively illustrate how mean-level analyses risk overlooking meaningful change that deviates from the average trajectory. Furthermore, identifying substantial, perceptible developmental variation around specific events can spur future research into the mechanisms underlying these differential trajectories. Perhaps differences in extraversion development can be better understood by attending to individual differences in health problem chronicity or social support following the event.

Even though health problems and loss of a loved one/family member are objectively loss related, negative events, they did not always result in maladaptive personality changes in our sample. Many participants reported that these events had a maladaptive effect on their personality development, but near equal numbers perceived that these events were a positive turning point that caused them to become more emotionally stable, agreeable, and conscientious than before. These perceptions matched measured trait changes in emotional stability and agreeableness development (but not conscientiousness) following these events. Researchers have debated whether posttraumatic growth is a common, measurable phenomenon (Jayawickreme et al., 2021). The results of the present study suggest that even though losing a loved one/family member and health problems can be associated with negative development, some people appear to react to these events with measurably positive personality trait changes, especially those who score higher on emotional stability in the year of the event. It may be that, for some people, losing someone close was not a negative event but instead a release from long-term suffering (Lodi-Smith et al., 2017), or that caring for others (in the case of losing a loved one) and being cared for (in the case of health problems) allowed some participants to deepen emotional connections and derive positive meaning in life (Bleidorn et al., 2021; Block, 2001).

Finally, when we explored associations between perceived change-inducing event characteristics and measured event-related development, associations between the two were generally small and nonsignificant, revealing the lack of simple correspondence between how and why events affect personality. The one exception to this was for emotional stability: People who perceived that the event changed them because it was negative, stressful, and reputationally damaging tended to decline in emotional stability both before and after the event. This result is in line with other research that has correlated event characteristics with measured personality change and found that

events perceived as more negative were associated with decreases in emotional stability (Haehner et al., 2021; Sutin et al., 2010), and research that has linked contamination narratives to lower emotional stability and life satisfaction (Dunlop et al., 2020). It suggests a commonsensical linkage central to clinical psychology, where lasting event-related increases in anxiety and depression are often attributed to stressful, negative, and interpersonally frictional characteristics of that event (Ormel et al., 2013).

Across all analyses, emotional stability was more strongly related to event-related development than the other Big Five factors. Perceived and measured changes in emotional stability were especially consistent, and this was the only personality factor whose development was consistently linked to event characteristics. This may be because changes in negative emotionality are particularly memorable—indeed, negative events seem to have primacy in our minds (Baumeister et al., 2001). It may also be that the trauma associated with a negative event has an especially lasting effect, leading people's recollections to be strongly consistent with their development (Goodman et al., 2019). Future research that studies perceptions of event-related development can build on these robust findings and test specific hypotheses about whether people have unique insight into change in this factor.

Limitations and Future Directions

One major limiting factor in this study was the necessary brevity of our Life Event Study questionnaire. We were only able to measure perceived event-related change with two questions per Big Five trait. Though we took steps to maximize their content coverage and fidelity to the 50-item yearly Big Five trait questionnaire, associations between perceived and measured change would undoubtedly be improved by measuring perceived change more thoroughly (ideally, with a 50-item mirror of the yearly trait questionnaire). Additionally, our measure of change-inducing event characteristics is based on recent taxonomic work (Luhmann et al., 2021), but we were limited to assessing characteristics using a single item each, and to maximize bandwidth and applicability to a wide range of events we did not measure additional or more specific event characteristics, like novelty, solitude, or responsibility, that may be linked to Big Five change. In retrospect, assessing change-inducing event characteristics with maximum brevity using the stem "the event had an impact on my personality because ..." may have lacked sufficient specificity, as participants would answer "no" if either that characteristic of the event was not present or that characteristic was present but was not perceived to impact personality. We advise future research not to conflate these two questions. Furthermore, because we sampled life events by asking participants about the single event that most impacted them, we were only able to examine the perceived effect of that one event. We designed the survey this way so that we could identify the strongest possible event-related developmental signal, but indeed many participants may have been affected by additional life events in the last 10 years that we did not measure.

Another limitation of this study concerns self-reported retrospective perceptions of personality change. There are both costs and benefits to measuring past change retrospectively. Participants may have misremembered the year in which an event occurred, or reported on an event that occurred more than 10 years ago, adding noise to our developmental estimates. This may explain why many participants identified that the event occurred in the earliest year we

offered (Figure 1)—the event may actually have occurred before then. This made it difficult to disentangle whether preevent personality development was truly related to experiences that occurred before the event. Additionally, participants may have been biased by their present circumstances when retrospectively on past personality trait change. This would have attenuated correlations between perceived and measured trait change. However, these retrospective reports captured important individual differences in present perceptions that we believe are useful to understand past personality development. Meaning-making takes place over time, just as personality development does, and so understanding the effect of a past event on subsequent personality change may best be done retrospectively, allowing participants time to integrate event-related changes into their self-perception. Indeed, this is a key point of narrative research (Pasupathi et al., 2007). Furthermore, by assessing perceived personality change and yearly trait change in separate sets of questionnaires, years apart from each other, we likely eliminated the possibility that answers to one questionnaire biased answers to the other. Convergent evidence from behaviorally assessed and other-reported trait measurement in future research can help researchers further understand the validity and utility of these retrospective assessments.

Finally, our representative sample allowed us to present population-level estimates for perceptions of life events and personality change; however, this representativeness applies only to the Netherlands. Future research on event-related change in other cultural contexts should be attendant to variation in event prevalence, normative timing, and culturally specific traditions (e.g., Bleidorn et al., 2013).

The findings of this study suggest fruitful directions for future research to understand heterogeneity in event-related personality development. To facilitate future data collection efforts, English and Dutch versions of the Life Events Questionnaire are available on the Open Science Framework page for this study (<https://osf.io/3dz87/>). To facilitate this research in the LISS data set, academic researchers can gain free access to the data collected for this study and link responses to the hundreds of other questionnaires that have been administered to the LISS sample by following this link (<https://www.lissdata.nl/access-data>).

Conclusion

Are life events linked to personality trait change? Past research has found that most people believe so (Rakhshani et al., 2022), and in this study, over 60% of participants indicated that a life event had changed who they are. Yet past research has not found replicable associations between life events and personality change (Bleidorn et al., 2020; Jackson & Beck, 2021). In this study, we found that a resolution to this paradox might involve accounting for individual differences in people's event experiences. Participants varied in their retrospective perceptions of if, when, how, and why their personalities changed in response to a life event in the last 10 years, and these perceptions were robustly associated with individual differences in measured personality trait changes in the years before and after these events. To continue developing our understanding of event-related personality change, future research must measure and account for individual differences in people's event experiences.

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